

If the metal is melted, the injection of water, or the opening of the furnace doors, will reduce the temperature of the heated parts; or lower the pressure of the steam if that should have been too high, and the safety valves be out of order.

By sounding with the rod, it will be ascertained when the metal is about to recongeal, as it becomes a soft solid into which the rod may be forced. If, accidentally, the metal congeals without taking in the rod, the end of the latter being heated, will melt the fusible alloy.

If the safety-valves do their duty, this metal will never be melted by increase of temperature, caused by an increase in the elastic force of the steam.

6. The true remedy for undue heating of boilers by deposits is frequently cleansing them. When this is impracticable, blowing out should be cautiously resorted to, so as not to lay the flues bare of water. The danger from these deposits is especially great in salt water, and muddy water mixed with calcareous matters. It should be guarded against by ascertaining the time required for the water used, to make a sensible deposit. No general rule in regard to this can be given, since boilers in different places and even those fed by springs at short distances apart are liable to deposits in different times.

Negligence on this point will always produce the rapid destruction of a boiler, and may cause it to burst, or even to explode.

No substitute for the care just recommended, has yet been found.

7. The following table of fusible alloys applicable to boilers working at pressures from one to thirteen atmospheres, is deduced from the experiments of the Committee.\* The alloys are those determined approximately, which at temperatures severally 15° Fah. above the working temperatures will allow a metallic stem to be drawn out from the mass. The principles which guided the Committee in their experiments may be seen by referring to Part I. of their Report (p. 36, &c.) The proportions are given in parts by weight.

*Table of alloys for use in closed tubes, and with a metallic stem.*

Working pressure in atmospheres.	Tin.	Lead.	Bismuth.	Working pressure in atmospheres.	Tin.	Lead.	Bismuth.	Working pressure in atmospheres.	Tin.	Lead.	Working pressure in atmospheres.	Tin.	Lead.
1½	8	8	7.5	4	8	8	3.4	8	8	8	12	8	12.3
2	8	8	6.2	5	8	8	2.2	9	8	9.8	13	8	13.2
2½	8	8	5.5	6	8	8	1.2	10	8	10.6			
3	8	8	4.6	7	8	8	0.5	11	8	11.4			

(TO BE CONTINUED.)

at is,—“There must be a district in Pennsylvania where the Shamrock is worn!” And he further thinks, that our sage Committee would be likely to propose, as the best means of preventing the loss of a key which would alone open a box, to *shut it up in the box!* We recommend to this ingenious critic to read this part of the report of the Committee carefully over again, and try whether he can discover no good reason suggested for enclosing the fusible alloy in a tube,—and no substantial answer to his *cui bono?*—If his own vision should fail him, perhaps he will do us the favour to borrow that of some intelligent friend. We are not aware that the “Shamrock” is at all indigestible to this country, though we have thistles and thorns a plenty.

\* Report of Com. on Expl. Part I. p. 36. Jour. Frank. Inst. vol. xvii. p. 86.

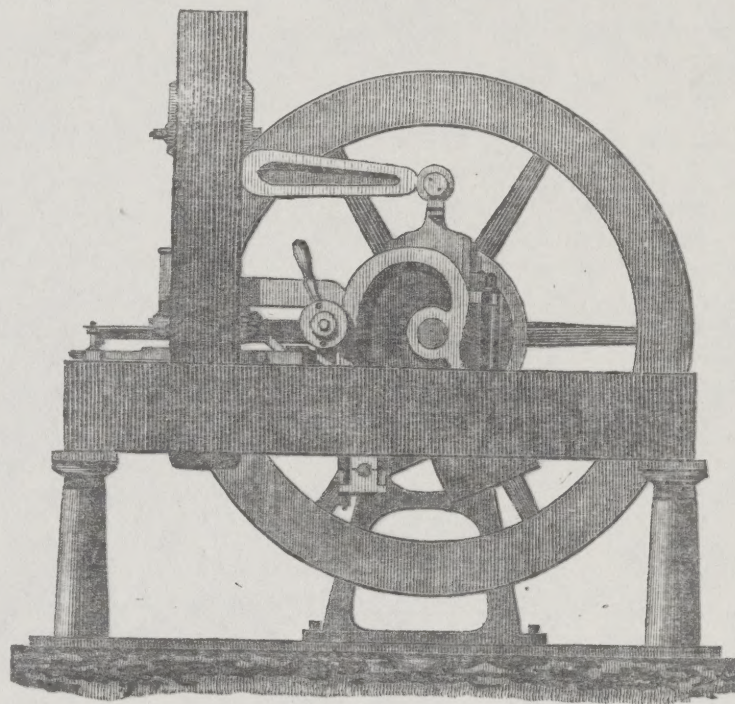
*Description of the new Coining Presses lately introduced into the U. S. Mint, Philadelphia.* By FRANKLIN PEALE, Esq.

TO THE COMMITTEE ON PUBLICATIONS.

GENTLEMEN:—After seven months of experience, it will not be considered premature, to send for publication, a brief notice of the Coining Press, a model of which I had the pleasure to exhibit and describe, at one of the Conversation Meetings at the Institute last year.

This press has been in operation since the 23rd of March last, the period of the first coinage by steam in the Mint of the United States; and the results, which are more than satisfactory, have authorized us to proceed with the most perfect confidence in the formation of the presses for the Branch Mints at New Orleans, and at Charlotte and Dahlonega, in North Carolina and Georgia; also, with the manufacture of others for the use of this Mint, all of which, it is probable, will be completed at an early period in the coming year.

*Side view of the Press.*



1 2 3  
Feet

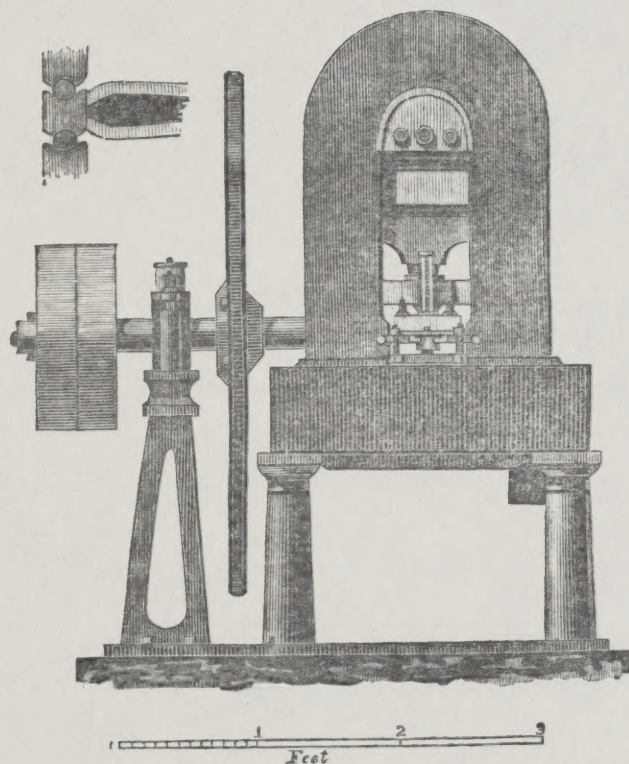
The above design exhibits a side view of the medium size press, intended to strike eagles, quarter dollars, and cents. Three grades have been adopted, corresponding in linear proportions to the numbers 9½, 7 and 6, suited to all the denominations of our coin respectively.

The design exhibits the general proportions and arrangement of parts, consisting of a shaft with a fast and loose pulley to receive motion by means of a strap from the moving power, whether water, steam, horse, or hand:—

the latter, of course, being least desirable, will only be used, when neither of the others is available. Upon this shaft is placed the fly wheel, the momentum of which, during one revolution at the rate of sixty per minute, is found, on trial, to be quite sufficient to overcome the resistance offered by the piece whilst subjected to the pressure of the dies. Upon the same shaft is the crank, which gives motion, through the pitman, to a lever and toggle-joint, the structure of which is exhibited in the left upper corner of the front view presented in the next figure.

The feeding in of the blanks, or planchets, and their discharge after being struck, is performed by an eccentric and set of levers, all combined in so simple a manner, as to be effectual, and not subject to derangement; as much of these parts as are visible in the two views, are faithfully exhibited, but it is impossible to describe them intelligibly without the aid of drawings of the separate parts; and, further, since the drawings were executed, changes have been made in the position and form of the eccentric, by which the press has been much improved; a general notice is all that is intended in the present communication.

Front view.



The feeding tube is a vertical pipe to receive the blanks, in which they are placed by hand, and from which they are taken by the feeders; the latter are so arranged, that when a crooked, or otherwise faulty blank impedes the motion, (not an unfrequent occurrence in coining,) the whole

is immediately released from action, and will not again operate until the impediment be removed.

A few familiar facts are added as evidences of the peculiar adaptation of the toggle-joint to coining, as proved by the operation of the press which is the subject of this notice.

1. The pressure acts with increasing force until the close of the operation, at which time its intensity is greatest, and it is always carried to the same extent.

2. No injury occurs from the absence of a blank from between the dies when the blow is given, an accident that results in the destruction, or great injury, to one, if not both, of the dies, in presses of the ordinary construction.

3. An immense saving of labour. From trial, we have ascertained, that a man, with one hand applied by means of a common winch handle, can coin eighty pieces per minute, (the experiment was tried upon cents, which have a diameter of  $1\frac{1}{10}$  inches.) A boy, fourteen years of age, was able to coin sixty per minute, without any unusual exertion; and lastly, it was impossible for the operator to tell, by the resistance offered to his exertions, whether the pieces were being coined or not.

It is by no means my wish to be considered the first who has applied the toggle-joint to the striking of coin. It is difficult to say to whom priority belongs; for presses on similar principles, are in use in more than one city of Germany, and their successful operation was witnessed at Carlsruhe, in the Grand Duchy of Baden. Particular advantage has also been derived from a careful examination of the coining presses of Monsieur Thonnellier of Paris. It is just to observe, that none of these presses were perfectly satisfactory. I have, therefore, made my own distribution and proportion of parts, thrown off whatever was complex, and added such as were necessary to its perfection, particularly, the arrangement for the disengagement of the feeders in case of the presence of defective pieces.

Our esteemed friend and fellow-citizen, Mr. M. W. Baldwin, several years since, commenced the construction of a press on similar principles. His talents and mechanical skill are amply sufficient for its completion; and it is to be regretted, therefore, that his numerous occupations have prevented his prosecution of the subject.

I take advantage of the present occasion, to make a few remarks on the application of steam power to coinage, as applied in the Royal Mint, on Tower-hill, London, which is one of the greatest curiosities in mechanics that I have ever seen, exhibiting consummate skill and great resources, on the part of the inventor, who, if I am not misinformed, was Mr. Boulton of Soho Works. For a series of years this machinery was kept rigidly secret; some even of the officers of the Mint not having the favour of seeing it accorded to them, and it might yet have remained so, if it were not for the advancement of liberal principles, which bid fair to keep pace with the rapid increase of mechanical ingenuity and skill.

The direct application of high steam to the screw press, would have answered every purpose, but still better, the substitution of the toggle-joint for the screw has rendered all this ingenious complexity unnecessary; but mechanics may make their own inferences from the following sketch.

A low pressure engine, is employed to create a vacuum in a large receiver, (in this case a misnomer,) by means of an air pump, which serves as a reservoir of power, through the agency of which the pressure of the atmosphere, is exerted as occasion requires, both for the *blow* and *recoil* of the screw press, the former, produced by a cylinder and piston, furnished with valves, one of which opens to the reservoir, and the other to the exter-

nal air, the latter, by a cylinder and piston, constantly acting, but with less power than the former. The valves are moved by levers which are struck at the proper time by a *plug frame* of similar construction to those employed in the ancient atmospheric engine. The power is communicated to the screw by tumbling shafts, connecting rods, and levers, the construction and operation of which could not be rendered intelligible without full drawings for reference. More words would, perhaps, render this brief notice as mysterious as the contrivance of which it treats; I will, therefore, close, by adding that eight of these systems, attached to eight screw presses, constitute the coining power of the British Mint.

*On the management of Turn-outs on Rail Roads.* By A. C. JONES, Engineer.

FOR THE JOURNAL OF THE FRANKLIN INSTITUTE.

GENTLEMEN:—At the present rapid rate of traveling on rail roads, it is a desideratum (in point of safety,) to know that the switches of the turn-outs are in the line of the road, so that the train is not necessitated to be much checked, in passing over them. The best method for insuring the right position of the switches, is that used on some short roads, by having a man stationed at them; but on long lines of road, where there are many turn-outs, this is not practised, owing to the expense attending it. As a substitute, a ball is placed on the end of the lever used to shift the switches, to show their position. This, I believe, is the best plan in use; that it is defective is proved by the numerous accidents occurring on rail roads by running off at the turn-outs, it not being foreseen that the switches are wrong. Where the turn-out is in, or at the end of a curve, it is difficult to tell by the ball how the turn-out stands, until you are so near as to make it impossible to stop in time, if it is not right.

The following arrangement will have a tendency to promote safety in this particular, and the additional expense will be but trifling. Instead of the ball, I propose having a board placed on the post, its face at right angles to the road, with hinges fastened to one edge, and from its face extends a short lever, which is connected to the lever that moves the turn-out, so that when the switches are changed, the dial, or board, takes either the horizontal or vertical position. This will be shown more fully by an inspection of the cuts.

On a curve or grade, this method would have the same advantages as on a straight part of the road, and it is evident, the face or edge being presented to the engineer, that he will be thereby enabled to judge how the turn-out stands, at a greater distance from it, than by the method in practice, and will consequently admit of his stopping the train in time to prevent accidents.

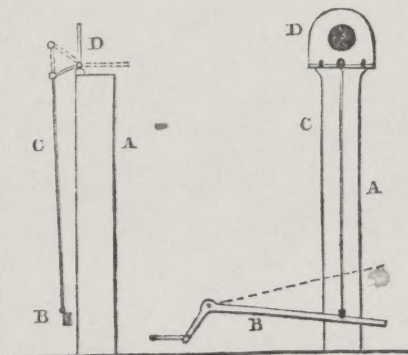
A. The post. B. The lever. C. Connecting rod. D. Dial.

Respectfully, yours,

A. C. JONES.

Philadelphia, Sept. 1836.

This appears to be a good suggestion. A board, or disk, with a black



conspicuous, and its position, in the way proposed, more easily perceived than the ball now in use. In turn-outs that are much used, it may be expedient to keep a lamp burning during the night, to show the position of the disk. It seems desirable, however, that every precaution should be taken to prevent the necessity of stopping a locomotive train in order to adjust the switches of a turn-out.

J. G.

**Franklin Institute.**

COMMITTEE ON SCIENCE AND THE ARTS.

*Report on Mr. C. Kenzie's Water Wheel.*

The Committee on Science and the Arts, constituted by the Franklin Institute of the State of Pennsylvania for the promotion of the Mechanic Arts, to whom was referred for examination the model of a Water Wheel, invented by Mr. C. Kenzie, of Troy, New York, REPORT:—

That they have carefully examined the object submitted to them, and find that it is a modification of the tub and the undershot wheel. The peculiarity of the invention consists in receiving the water from a number of chutes at once, distributed around the periphery of the wheel. The buckets or float-boards, are set in the direction of the radii, and the water is directed as nearly as practicable in the line of a tangent to each float. In this arrangement the water is, of necessity, discharged from the wheel within the rim, or shrouding, and is allowed a free escape on both sides of the wheel. The wheel is placed in a horizontal position, at the bottom of the fall, entirely under water, and is surrounded by a box or tank of an equal depth with the wheel, to which it is accurately fitted to prevent the escape of water between them, whilst it permits the latter to revolve freely.

The supply of water is through a water-tight trunk connected with the tank, by which the entire head and fall is made available, the wheel being sunk below the lower level as before stated.

One of the benefits arising from this arrangement, is that of the water being received on the wheel in a compact form, owing to the spaces being kept always full by the centrifugal force. A principal advantage, however, is that of being able to employ a much greater quantity of water than could be brought to bear upon the floats by any other wheel of equal size.

The Committee believe that the advantages above enumerated, are in accordance with the principles of hydrodynamics, and that its inventor has attained a high degree of perfection in that description of wheel, and they are happy to add, that so far as their knowledge extends, the arrangement is new.

The Committee take leave to suggest, that since the water always retains a part of its power, proportionate to the square of its velocity, on leaving the wheel, no inconsiderable portion of it would be saved in this instance by extending the buckets to the centre, so as to deliver the water at as low a velocity as possible; and they would also recommend the use of a partition which should cause all the water to take the same course in the floats. In this case the rim must of course be made wider so as to contract the diameter of the opening to what would be just sufficient for a free delivery of the water.

By order of the committee.

Oct. 13, 1836.

WILLIAM HAMILTON, *Actuary.*